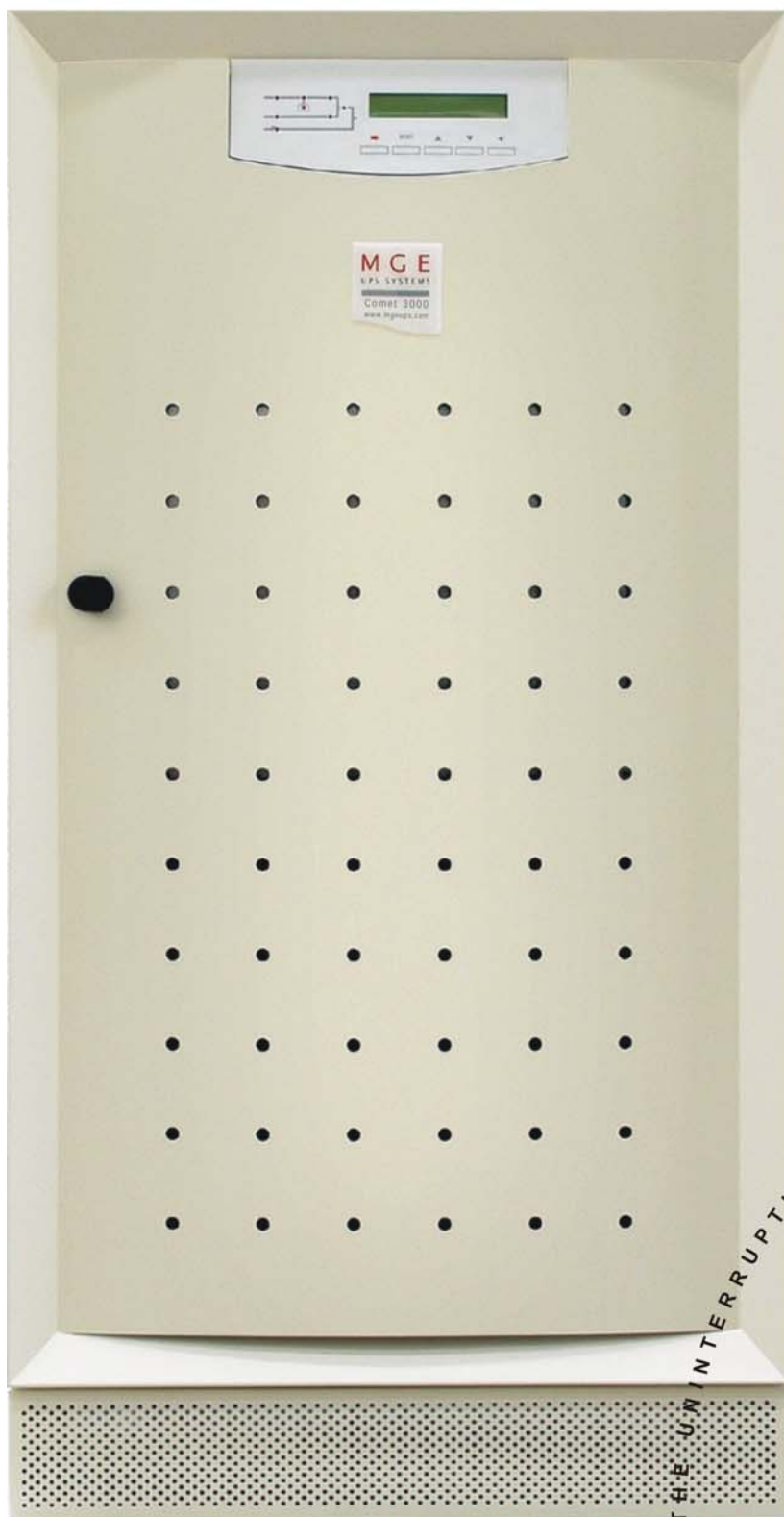


COMET 3000 3:1
COMET 3000 3:3
15–80kVA

**Installation and user
manual**

English



THE UNINTERRUPTIBLE POWER PROVIDER

M G E
UPS SYSTEMS

UPS OPERATING MANUAL

Index of sections	Code
1 – UPS GENERAL DESCRIPTION AND INSTALLATION	34005002EN
2 – FRONT PANEL	34005003EN
3 – START-UP, SHUT-DOWN AND MANUAL BYPASS	34005004EN
4 – REMOTE CONNECTION OF THE UPS	34005005EN

UPS GENERAL DESCRIPTION AND INSTALLATION

Index

1. INTRODUCTION.....	3
1.1 ENVIRONMENT.....	3
1.1.1 ISO 14001 certification.....	3
1.1.2 UPS treatment at the end of service life.....	3
1.1.3 Packing	3
1.1.4 Lead battery.....	3
1.2 SAFETY RULES.....	3
1.2.1 Safety of persons	3
1.2.2 Product safety	4
1.2.3 Special precautions	4
2. UPS GENERAL DESCRIPTION.....	5
2.1 TYPOLOGY	5
2.2 SYSTEM DESCRIPTION	6
2.2.1 Rectifier.....	6
2.2.2 Inverter.....	6
2.2.3 Battery and battery charger	6
2.2.4 Static bypass	6
2.2.5 Manual bypass	6
2.2.6 Front panel.....	6
2.3 OPERATING STATUS.....	7
2.3.1 Normal operation	7
2.3.2 Load supplied by bypass due to inverter fault.....	7
2.3.3 Rectifier failure or mains failure	8
2.3.4 Manual bypass	8
3. INSTALLATION.....	9
3.1 RECEIPT OF THE UPS	9
3.2 HANDLING OF THE UPS.....	9

3.3	POSITIONING AND INSTALLATION	10
3.3.1	Base plan, static load and weights	10
3.3.2	Dimensions and distances	11
3.4	ELECTRICAL CONNECTION.....	12
3.4.1	Terminal board	13
3.5	BATTERY CONNECTION AND POSITIONING	14
3.6	EXTERNAL BATTERY	15
3.6.1	Dimensions and weights	16
3.6.2	Connections.....	18

Index of pictures

<i>Picture 1 - Block diagram</i>	<i>5</i>
<i>Picture 2 - Normal operation.....</i>	<i>7</i>
<i>Picture 3 - Load supplied by bypass.....</i>	<i>7</i>
<i>Picture 4 - Rectifier failure or mains failure.....</i>	<i>8</i>
<i>Picture 5 - Manual bypass</i>	<i>8</i>
<i>Picture 6 - Handling of UPS from 15kVA to 80kVA</i>	<i>9</i>
<i>Picture 7 - Base plan</i>	<i>10</i>
<i>Picture 8 - Dimensions and distances from the walls.....</i>	<i>11</i>
<i>Picture 9 - Terminal board UPS 15kVA÷30kVA 1Ph.....</i>	<i>13</i>
<i>Picture 10 - Terminal board UPS 20kVA÷30kVA 3Ph.....</i>	<i>13</i>
<i>Picture 11 - Terminal board UPS 40kVA÷80kVA 3Ph.....</i>	<i>13</i>
<i>Picture 12 - Battery connection UPS 15kVA÷30kVA.....</i>	<i>15</i>
<i>Picture 13 - Base plan of the external battery cabinet.....</i>	<i>16</i>
<i>Picture 14 - Dimensions of the external battery cabinet.....</i>	<i>16</i>
<i>Picture 15 - Battery cabinets connections</i>	<i>18</i>

1. INTRODUCTION

1.1 ENVIRONMENT

1.1.1 ISO 14001 certification

The product was manufactured in a factory certified ISO 14001 respecting eco-design rules.

1.1.2 UPS treatment at the end of service life

MGE UPS SYSTEMS undertakes to recycle, by certified companies and in compliance with all applicable regulations, all UPS products recovered at the end of their service life (contact your branch office).

1.1.3 Packing

UPS packing materials must be recycled in compliance with all applicable regulations.

1.1.4 Lead battery

This product contains lead-acid batteries. Lead is a dangerous substance for the environment if it is not correctly recycled by specialised companies.

1.2 SAFETY RULES

1.2.1 Safety of persons

The UPS must be installed in a room with restricted access (qualified personnel only, according to standard EN50091-1-2).

A UPS has its own internal power source (the battery). Consequently, the power outlets may be energised even if the UPS is disconnected from the AC-power source.

CAUTION

If primary powers isolators are installed in other area from UPS area.

You must stick the following warning label on them.

"ISOLATE UNINTERRUPTIBLE POWER SUPPLY (UPS) BEFORE WORKING ON THIS CIRCUIT"

Dangerous voltage levels are present within the UPS. It should be opened exclusively by qualified service personnel.

Warning, after the UPS shut-down, a dangerous voltage will be present on the battery selector BCB.

The UPS must be properly earthed.

The battery supplied with the UPS contains small amounts of toxic materials. To avoid accidents, the directives listed below must be observed.

Never operate the UPS if the ambient temperature and relative humidity are higher than the levels specified in the documentation.

Never burn the battery (risk of explosion).

Do not attempt to open the battery (the electrolyte is dangerous for the eyes and skin).

Comply with all applicable regulations for the disposal of the battery.

1.2.2 Product safety

A protection circuit breaker must be installed upstream and be easily accessible.

Never install the UPS near liquids or in an excessively damp environment.

Never let a liquid or foreign body penetrate inside the UPS.

Never block the ventilation grates of the UPS.

Never expose the UPS to direct sunlight or a source of heat.

1.2.3 Special precautions

The UPS connection instructions contained in this manual must be followed in the indicated order.

Check that the indications on the rating plate correspond to your AC-power system and to the actual electrical consumption of all the equipment to be connected to the UPS.

If the UPS must be stored prior to installation, storage must be in a dry place.

The admissible storage temperature range is -10° C to +45° C.

If the UPS remains de-energised for a long period, we recommend that you energise the UPS for a period of 24 hours, at least once every month. This charges the battery, thus avoiding possible irreversible damage.

The UPS is designed for normal climatic and environmental operating conditions as defined in the "appendices" chapter: altitude, ambient operating temperature, relative humidity and ambient transport and storage conditions.

Using the UPS within the given limits guarantees its operation, but may affect the service life of certain components, particularly that of the battery and its autonomy. The maximum storage time of the UPS is limited due to the need to recharge its integrated battery.

Unusual operating conditions may justify special design or protection measures:

- harmful smoke, dust, abrasive dust,
- humidity, vapor, salt air, bad weather or dripping,
- explosive dust and gas mixture,
- extreme temperature variations,
- bad ventilation,
- conductive or radiant heat from other sources,
- strong electromagnetic fields,
- radioactive levels higher than those of the natural environment,
- fungus, insects, vermin, etc.,
- battery operating conditions.

The UPS must always be installed in compliance with:

- **the requirements of HD 384.4.42 S1/A2 - Chapter 42: Protection from thermal effects.**

- standard IEC 60364-4-482 - Chapter 482: Fire protection.

The manufacturer declines all responsibility for damages to people or equipment deriving from non-fulfilment of the above.

2. UPS GENERAL DESCRIPTION

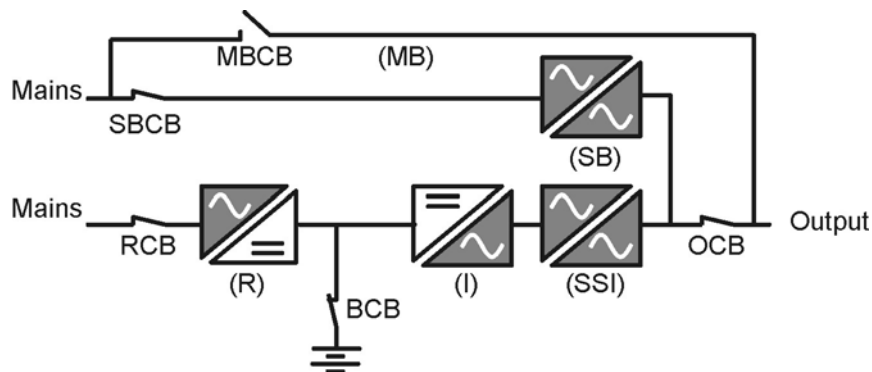
2.1 TYPOLOGY

All UPS covered by this manual are on-line, double conversion; the inverter supplies always energy to the load, whether mains is available or not (according to the battery autonomy time).

WARNING

The UPS output is energized even during mains failure, therefore in compliance with the prescriptions of EN 50091-1, the installer will have to identify the line or the plugs supplied by the UPS making the User aware of this fact.

This configuration guarantees the best service to the User, as it supplies clean continuously regulated power and guarantees the voltage and frequency will be stabilised at nominal value independently from mains status. Thanks to the double conversion, it makes the load completely immune from micro-interruptions due to excessive mains variation, and prevents damage to the critical load (Computer - Instrumentation - Scientific equipment etc.).



Picture 1 - Block diagram

2.2 SYSTEM DESCRIPTION

2.2.1 Rectifier

It converts the three phase voltage of the mains into continuous DC voltage.

It uses a three phase 6 pulses fully-controlled thyristors bridge.

It's designed to supply the inverter at full load and the battery at the maximum recharge current. The system offers very low ripple content during the charging cycle.

2.2.2 Inverter

It converts the continuous voltage coming from the rectifier or from the battery into alternating voltage stabilized in amplitude and frequency.

The inverter uses IGBT technology with a frequency commutation of approximately 10 KHz.

The control electronics is completely digital and uses a 16 Bit μ P, that, thanks to its processing capability, generates an excellent output sine-wave, which has a very low distortion even in presence of loads having high crest factor currents.

2.2.3 Battery and battery charger

On the 15-30kVA 3:1 and 20-30kVA 3:3 UPS battery can be located inside the UPS for autonomy from 5 up to 15 minutes depending on the UPS power (see tables page 10); on the other hand, battery is placed on external cabinet.

Warning: only the 15-30kVA 3:1 and 20-30kVA 3:3 UPS can have internal batteries. The UPS with bigger sizes have to be placed on external battery cabinets.

The battery charger control logic is completely integrated inside the total-controlled rectifier control board; the battery is charged, according to the DIN 41773 Standard, every time it has been partially or completely discharged and it is kept floating, even when it's charged, to compensate for any autodischarge.

2.2.4 Static bypass

It's designed to transfer the load between INVERTER and MAINS, and vice-versa, without break, and uses SCR's as power commutation elements.

2.2.5 Manual bypass

It's used to by-pass the UPS, supplying the load directly to the mains in case of maintenance or serious failure.

WARNING

The sequence of bypass switching must be carried out with respect to the procedure indicated on the UPS and in the chapter "Start-up, shut-down and manual bypass". The manufacturer cannot accept responsibility for damages arising from incorrect operation.

2.2.6 Front panel

The front panel of the UPS, consisting of a double row alphanumeric displays plus 5 function keys, allows the complete monitoring of the UPS status.

The mimic diagram helps to understand the operating status of the UPS.

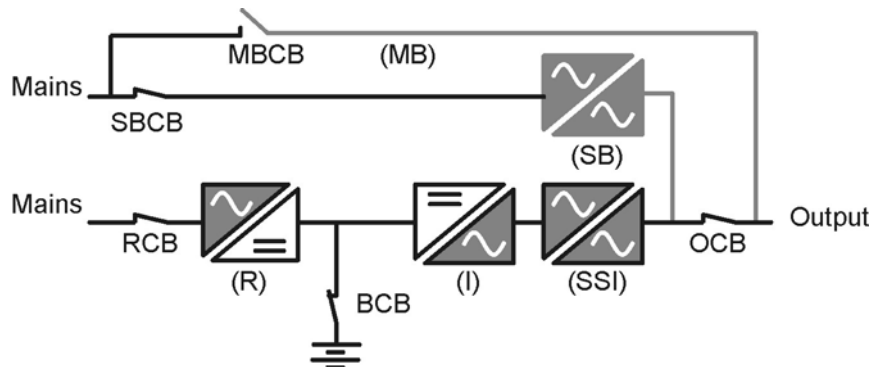
For more information see the chapter "FRONT PANEL".

2.3 OPERATING STATUS

The following paragraphs show all the possible operating status of the UPS.

2.3.1 Normal operation

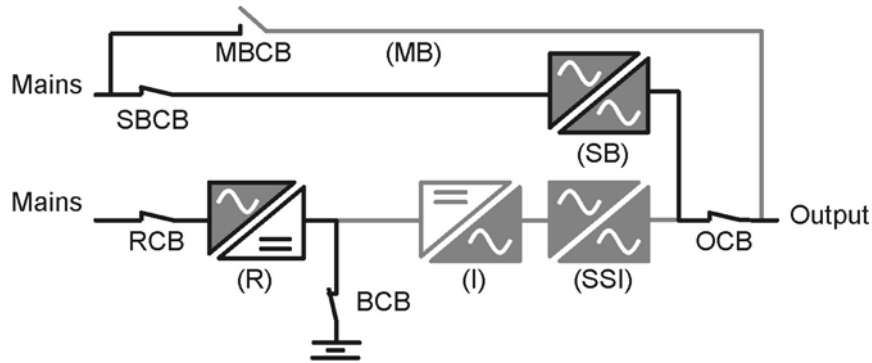
The inverter is supplied by the rectifier; the load, through the static switch, is supplied directly by the inverter output.



Picture 2 - Normal operation

2.3.2 Load supplied by bypass due to inverter fault

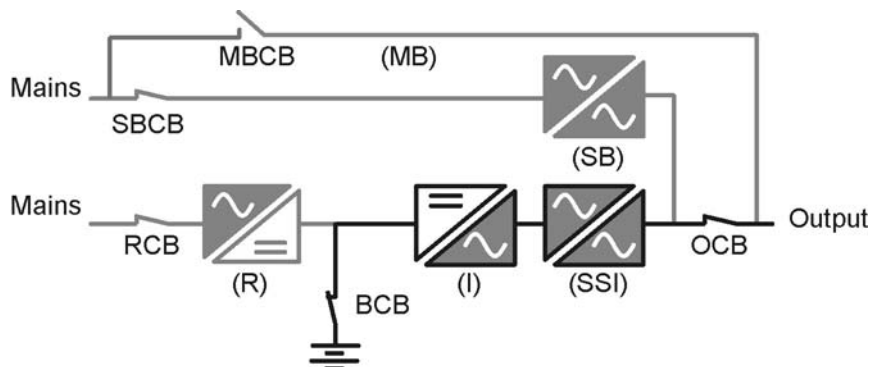
The load is transferred to bypass through the static switch; the transfer is carried out without interruption.



Picture 3 - Load supplied by bypass

2.3.3 Rectifier failure or mains failure

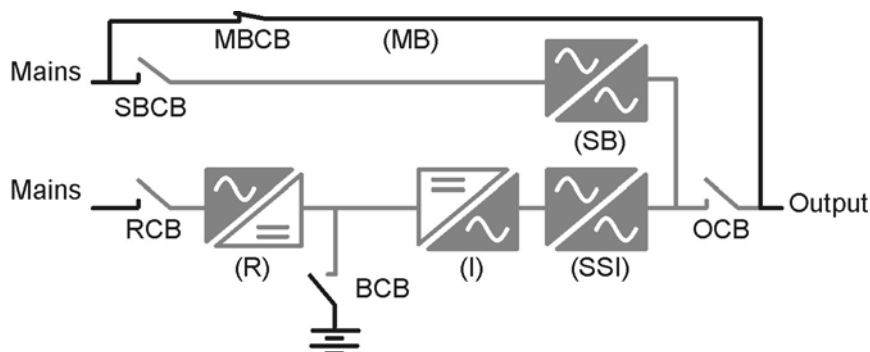
The inverter is supplied by the battery for the required autonomy time; the load, through the static switch, is supplied directly by the inverter output.



Picture 4 - Rectifier failure or mains failure

2.3.4 Manual bypass

The load is supplied by the mains through the manual bypass; the operator can work in safety on the UPS to carry out maintenance or repairing operations.



Picture 5 - Manual bypass

3. INSTALLATION

3.1 RECEIPT OF THE UPS

When the UPS is received, please attend immediately to its unpacking and carry-out an accurate visual check to be sure that the equipment has not been damaged during transport.

IMPORTANT

In case of objections relating to damage incurred during transport these must be immediately notified to the transportation company after receipt of the equipment.

When the UPS is not installed immediately it must be stored carefully in vertical position, as indicated on the packing and conserved in a dry and sheltered room in its box so that it is protected from dust.

3.2 HANDLING OF THE UPS

Before positioning the UPS, in order to avoid risks of turnover, it's recommended to move the system on the wood pallet on which the UPS is fixed.

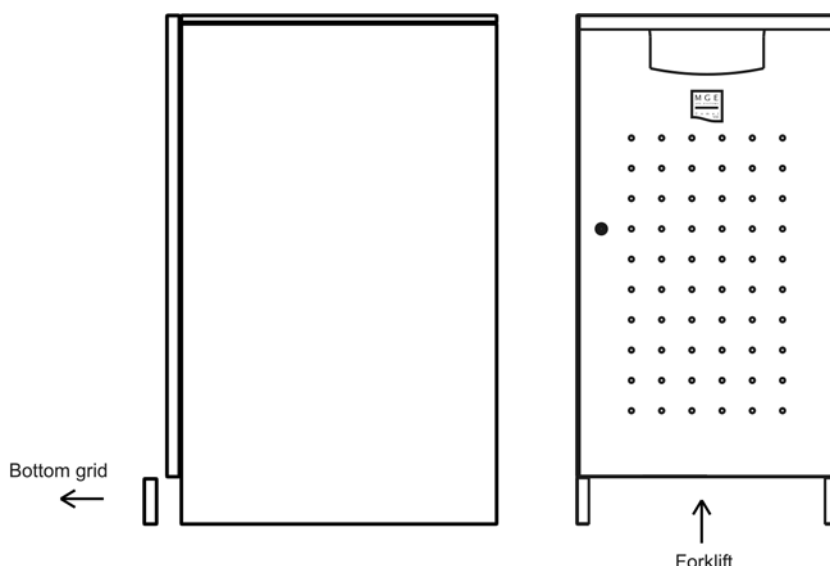
Before the positioning in the final location, remove the UPS from the pallet.

The UPS can be lifted and handled using a pallet truck or a forklift.

- UPS from 15kVA to 80kVA

The UPS can be handled only after having taken-off (manually), the lower front panel, so that a pallet truck or a forklift can be inserted (see picture 6).

The UPS technical data are shown on a label fixed on the internal side of the front door.



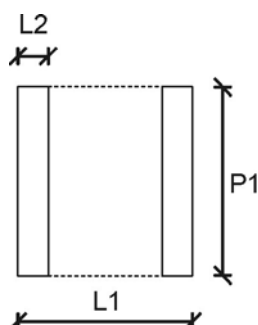
Picture 6 - Handling of UPS from 15kVA to 80kVA

3.3 POSITIONING AND INSTALLATION

The UPS must be installed in a clean and dry room, preferably not dusty. The User must ensure that there is enough air exchange in the room so that the equipment can be adequately cooled; if this is not guaranteed, the room must be adequately aired.

If the UPS contains the batteries internally the air exchange with the external ambient will have to be according to EN 50091-1, annex N.

3.3.1 Base plan, static load and weights



Picture 7 - Base plan

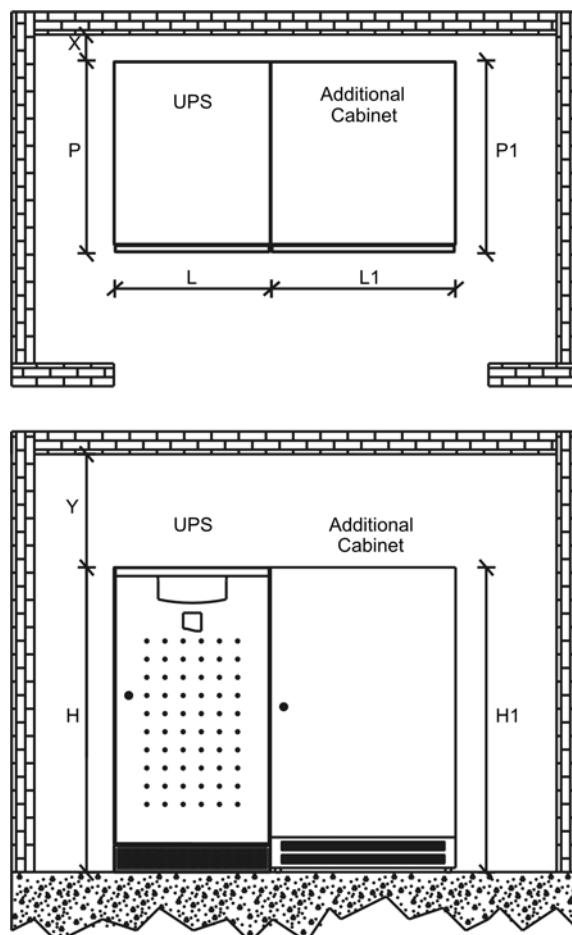
UPS (kVA)	15	20	30	40	60	80
	1Ph & 3Ph					
L1 – mm	650					
P1 – mm	820					
L2 – mm	25					

1Ph UPS (kVA)	15	20	30
Weight w/o battery – kg	293	308	320
Weight with battery (5 minutes autonomy) – kg	422	437	487
Weight with battery (10 minutes autonomy) – kg	460	475	621
Weight with battery (15 minutes autonomy) – kg	490	505	

3Ph UPS (kVA)	20	30
Weight w/o battery – kg	323	339
Weight with battery (5 minutes autonomy) – kg	452	506
Weight with battery (10 minutes autonomy) – kg	490	640
Weight with battery (15 minutes autonomy) – kg	520	

3Ph UPS (kVA)	40	60	80
Weight w/o battery – kg	385	439	456

3.3.2 Dimensions and distances



Picture 8 - Dimensions and distances from the walls

UPS (kVA)	15	20	30	20	30	40	60	80
	1Ph			3Ph				
L – mm	690							
P – mm	875							
H – mm	1345							
X (min.) – mm	50							
Y (min.) – mm	500							
ADD. CABINET	WWCBV011							
L1 – mm	815							
P1 – mm	820							
H1 – mm	1345							

The additional cabinet WWCBV011 is used for external battery.

3.4 ELECTRICAL CONNECTION

The electrical connection is part of the work which is normally provided by the supplier that carries out the electrical installation and not by the UPS manufacturer. For this reason, the following recommendations are only an indication, as the UPS manufacturer is not responsible for the electrical installation.

In any case we recommend to carry-out the installation and the electrical connections of the input and output in compliance with the local standards.

During the electrical installation take particular care to check the phase rotation with a suitable instrument.

- UPS from 15kVA to 30 kVA

The terminals are positioned at the front of the UPS and they can be accessed by opening the front door.

- UPS from 40kVA to 80 kVA

The terminal boards are positioned at the front of the UPS, under the breakers. To access the terminals remove the protection, extracting the fixing bolts.

WARNING

The connection to the mains must be carried out with protection fuses or circuit breakers between the mains and the UPS.

The use of residual current devices in the line supplying the UPS is unadvisable. The leakage current due to the RFI filters is rather high and it can cause spurious tripping of the protection device.

According to the EN50091-1 standard, in order to take into account the UPS' leakage current, residual current devices having adjustable threshold can be used (see tables).

1Ph UPS (kVA)	15	20	30
Leakage current L1-L2-L3-N (mA)	30	30	30
Leakage current L1-L2-L3 (mA)	200	200	200

3Ph UPS (kVA)	20	30	40	60	80
Leakage current L1-L2-L3-N (mA)	30	30	40	40	80
Leakage current L1-L2-L3 (mA)	20	20	20	20	30

The connection cables section is shown in the following tables.

1Ph UPS (kVA)		15	20	30
Input fuses (A)	Rectifier	3x32	3x50	3x80
	Bypass	1x100	1x150	1x200
Input cables (mm ²)	Rectifier	3x6	3x10	3x25
	Bypass	2x25	2x35	2x70
Output cables (mm ²)		2x25	2x35	2x70
Battery cables (mm ²)		2x10	2x16	2x25

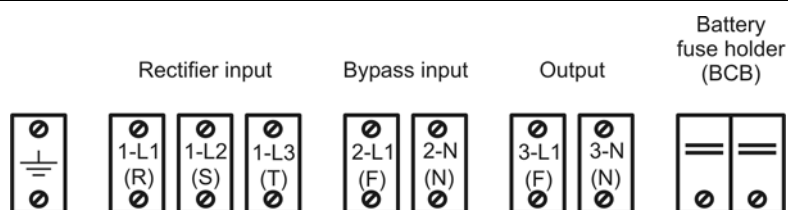
Ups general description & installation

3Ph UPS (kVA)		20	30	40	60	80
Input fuses (A)	Rectifier	3x50	3x80	3x100	3x150	3x150
	Bypass	-	-	3x150	3x200	3x200
Input cables (mm ²)	Rectifier	4x10	4x25	3x35	3x50	3x70
	Bypass	-	-	4x35	4x50	4x70
Output cables (mm ²)		4x10	4x25	4x35	4x50	4x70
Battery cables (mm ²)		2x16	2x25	2x50	2x50	2x70

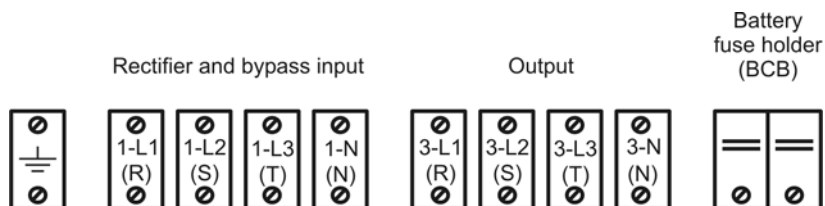
3.4.1 Terminal board

NOTE

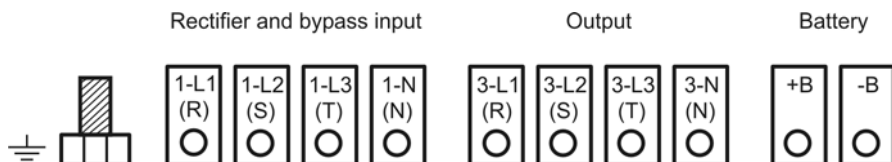
For UPS ≤ 30kVA the battery fuse holder is connected to internal battery.



Picture 9 - Terminal board UPS 15kVA÷30kVA 1Ph



Picture 10 - Terminal board UPS 20kVA÷30kVA 3Ph



Picture 11 - Terminal board UPS 40kVA÷80kVA 3Ph

3.5 BATTERY CONNECTION AND POSITIONING

IMPORTANT

For battery installation please respect the EN62040-1-2 prescriptions, paragraph 4.9.20, and at the same time all the national rules or specifications which can be applied to the premises or building.

To obtain the battery life indicated by the battery manufacturer, the operating temperature must remain between 0 and 25 °C. However, although the battery can operate up to 40 °C, there will be a significant reduction of the battery life.

To avoid the formation of any kind of potentially explosive hydrogen and oxygen mixture, suitable ventilation must be provided where the battery are installed (see EN62040-1-2 annex N).

For the materials installed in France, we have to apply the rules according to NFC 15-100 article 554.2: the volume of the renewed air has to be at least $0,005 \text{ NI m}^3$ per hour, where N is the number of the elements inside the battery and I is maximum current of the rectifier.

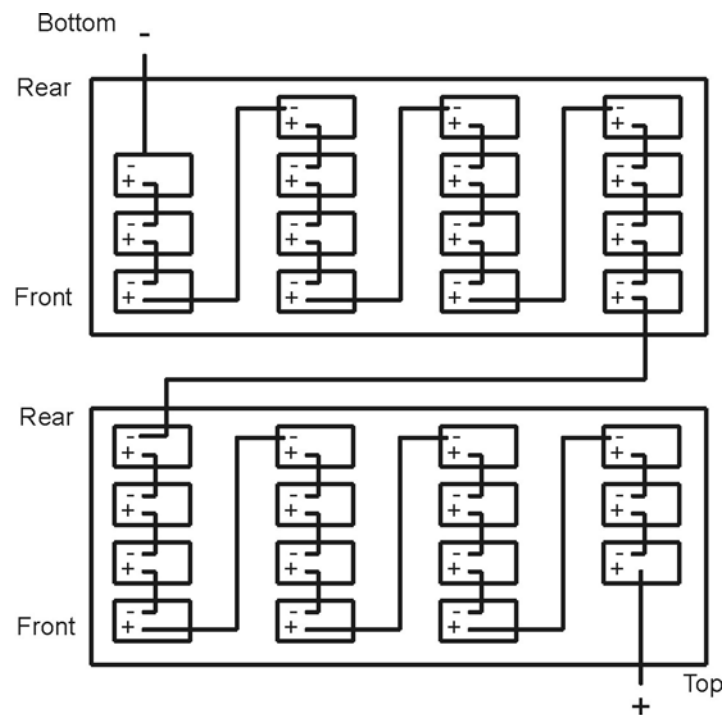
The batteries can be internal or external, however, it is recommended to install them when the UPS is capable of charging them. Please remember that, if the battery is not charged for periods over 2-3 months they can be subject to irreparable damage.

In order to avoid any damage during the transport battery is delivered with some connection cables disconnected (in order to have a battery voltage for each shelf less than 120V) and with protective cardboard.

At the time of the installation you will have to provide to remove the protective cardboard (**as indicated on label 3400433900**) and to reconnect the cables (**as indicated on label 5102881200**).

IMPORTANT

Only the UPS's 15-20KVA and 30kVA (up to 10' autonomy) 1Ph and 3Ph, have internal batteries. The bigger sizes must be connected with external battery cabinets.



Picture 12 - Battery connection UPS 15kVA÷30kVA

3.6 EXTERNAL BATTERY

The external battery is used to increase the UPS autonomy time during mains failure. It's always provided for UPS's having ratings 30KVA 15' auton. and UPS > 40kVA

IMPORTANT

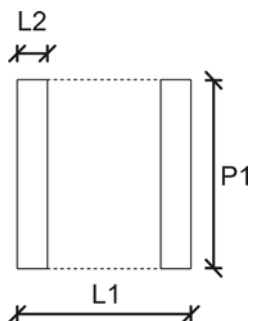
With an external battery, the internal battery isn't necessary.

The battery circuit breaker is installed inside the external battery cabinet, so it's not provided in the UPS.

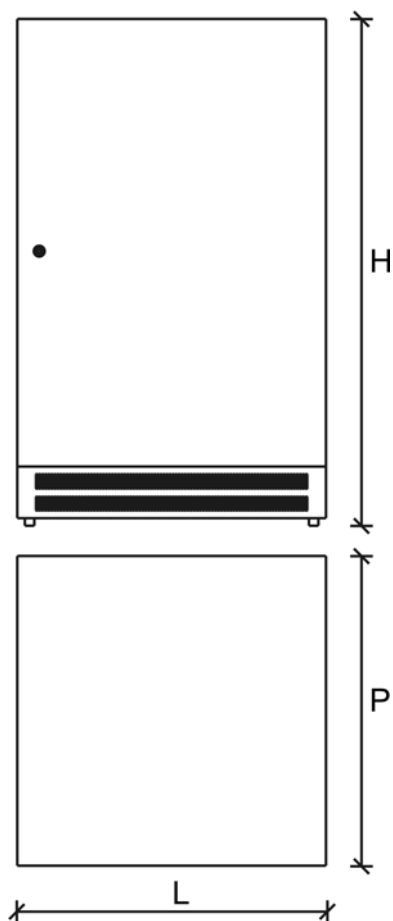
Concerning the installation of the external battery cabinet, refer to the details given in paragraph 3.5.

3.6.1 Dimensions and weights

The dimensions and weights of the external battery cabinet are indicates here under.



Picture 13 - Base plan of the external battery cabinet



Picture 14 - Dimensions of the external battery cabinet

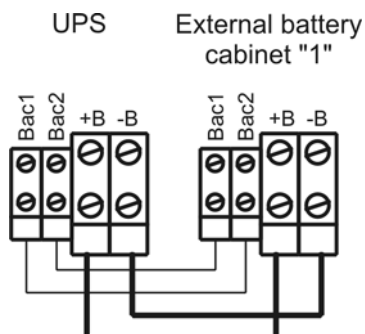
Ups general description & installation

CABINET	AS410
L – mm	815
P – mm	820
H – mm	1345
L1 – mm	775
P1 – mm	775
L2 – mm	25

TYPE CABINET	WEIGHT (KG)
AS410 (Without battery)	161
AS410_6418 (64 x 18Ah)	555
AS410_3224 (32 x 24 Ah)	462
AS410_3238 (32 x 38 Ah)	641
AS410_6424 (64 x 24 Ah)	763
AS410_3264 (32 x 64 Ah)	929
AS410_6438 (64 x 38 Ah)	1089

3.6.2 Connections

The following picture shows the electrical connection between the UPS and the external battery cabinet.



Picture 15 - Battery cabinets connections

The connection cables are two power cables, with section of 50mm² (see following table) and with length ranging from 2 to 50m. Longer cables are subject to excessive voltage drop, so their section must be increased accordingly.

1Ph UPS (kVA)	30 15' Autonomy
Battery cables (mm ²)	2x50

3Ph UPS (kVA)	30 15' Autonomy	40	60	80
Battery cables (mm ²)	2x50	2x50	2x50	2x50

FRONT PANEL

Index

1. INTRODUCTION.....	3
2. DESCRIPTION.....	4
2.1 MIMIC DESCRIPTION	4
2.2 ALARMS AND OPERATING STATUS.....	5
3. LCD DISPLAY MANAGEMENT	8
3.1 DEFAULT	8
3.2 MAIN MENU	8
3.3 MEASURES.....	9
3.3.1 Output	10
3.3.2 Bypass	10
3.3.3 Inverter	11
3.3.4 AC/DC.....	11
3.3.5 Battery.....	12
3.4 ALARMS.....	13
3.4.1 UPS Status.....	13
3.4.2 History.....	14
3.4.3 List of alarms and status	15
3.5 SPECIAL.....	16
3.5.1 Reset	17
3.5.2 Settings.....	17
3.5.3 Test Ups	17
3.5.4 Battery test	17
3.5.5 Reset history	18
3.5.6 Protocol type	18
3.6 MENU STRUCTURE.....	19

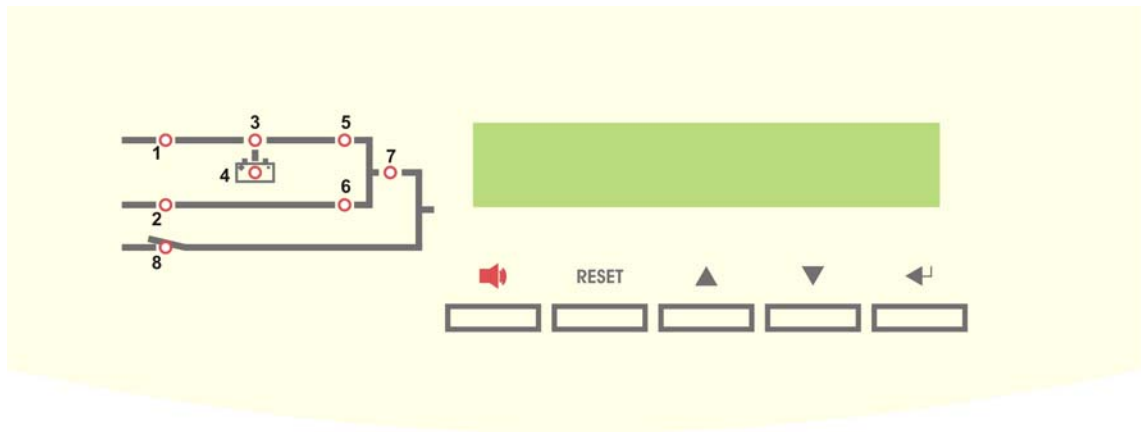
Index of pictures

<i>Picture 1 - Front panel</i>	<i>3</i>
<i>Picture 2 - Menu structure</i>	<i>19</i>

1. INTRODUCTION

The front panel of the UPS, consisting of a double row alphanumeric display plus 5 function keys, allows the complete monitoring of the UPS status.

The mimic flow helps to understand the operating status of the UPS.



Picture 1 - Front panel

2. DESCRIPTION

2.1 MIMIC DESCRIPTION

Picture1 shows the mimic present on the display, with the names of the circuit breakers/isolator switches of the UPS. Also the led's and blocks that comprise the UPS are clearly identified.

LED 1	⇒	Lit-up green = Mains present at the rectifier input. Otherwise off.
LED 2	⇒	Lit-up green = Emergency line present and phase sequence correct. Otherwise off.
LED 3	⇒	Lit-up green = Rectifier feeding correctly. Lit-up red = Rectifier output voltage out of tolerance.
LED 4	⇒	Lit-up green = Battery OK. Green flashing = Battery discharging or battery in test. Orange flashing = BCB open. Lit-up red = Battery test aborted.
LED 5	⇒	Lit-up green = Inverter static switch closed. Otherwise off.
LED 6	⇒	Lit-up orange = Emergency line static switch closed. Otherwise off.
LED 7	⇒	Lit-up green = Voltage present on the load. Lit-up orange = OCB circuit breaker open.
LED 8	⇒	Lit-up orange = Manual by-pass closed. Otherwise off.

2.2 ALARMS AND OPERATING STATUS

The alphanumeric display offers a complete diagnostic of the system by showing 25 alarms and 6 operating status descriptions.

Each alarm is associated to a code that allows it to be stored in the events history.

A1 MAINS FAULT = Rectifier input mains failure

Possible causes:

- 1) Central system black-out (mains failure)
- 2) Distribution problems upstream of the UPS
- 3) RCB open

A2 CHARGER FAULT = Battery charger failure

A3 RECT FUSE = One or more rectifier fuses are blown

A4 THER IMAGE = Load transferred to mains due to overload. After 30' the load is transferred back to inverter

A5 AC/DC FAULT = Rectifier output voltage out of tolerance

Possible causes:

- 1) Mains input voltage too high/low
- 2) Distribution problems upstream of the UPS
- 3) RCB open
- 4) Rectifier bridge failure

A6 INPUT WR SEQ = Input phase rotation not correct

A7 BCB OPEN = Battery circuit breaker open

A8 BATT DISCH = The battery is discharging

Possible causes:

- 1) Rectifier input mains failure (alarm A1 present)
- 2) Rectifier failure

A9 BATT AUT END = Battery autonomy (calculated) has expired

A10 BATT FAULT = Battery test failed

Possible causes:

- 1) The test has been carried out with the battery not perfectly charged
- 2) One or more battery cells are damaged

A11 BATT IN TEST = Battery test in progress

A12 PLL FAULT = Problems with the digital synchronisation system

Possible causes: 1) Emergency mains excessively disturbed or

- intermittent
- 2) Mains variation speed not acceptable for the UPS (for load protection reasons)

A13 INV OUT TOL = Inverter output voltage out of tolerance

- Possible causes:
- 1) Intervention of the inverter current limitation for excessive load (more than 200%)
 - 2) Inverter failure

A14 OVERLOAD = Inverter overload (load exceeding 100%). The thermal image protection is started

A15 BYP FAULT = Emergency mains not available

- Possible causes:
- 1) Emergency mains failure
 - 2) Distribution problems upstream of the UPS
 - 3) SBCB open
 - 4) Wrong input phase rotation

A16 BYP FEED LOAD = Load fed by bypass

- Possible causes:
- 1) Inverter overload
 - 2) Thermal image intervention
 - 3) Forced commutation due to the bypass switch operation
 - 4) Inverter failure

A17 RETR BLOCK = Re-transfer between bypass and inverter blocked, load on bypass

- Possible causes:
- 1) Excessive repeated overloads on inverter

It is possible, after having verified that the load is correct, to reset the UPS, and switch back the load to the inverter (see menu SPECIAL).

A18 MBYP CLOSE = Manual bypass breaker closed (the inverter is shutdown)

A19 OCB OPEN = UPS output breaker open

A20 FANS FAILURE = Optional

A21 HIGH TEMP = High temperature on the inverter and/or rectifier bridge

- Possible causes:
- 1) Excessive load
 - 2) Failure or malfunctioning of the cooling system

- 3) Wrong positioning of the UPS (distance from walls, altitude)

A22 BYP SWITCH = Closure of the commutation switch which forces the load to bypass (maintenance)

A23 EPO BUS = Intervention of the emergency power off switch according to the EN50091-1

A24 CURR STOP = Inverter bridge stop for max current

- Possible causes:
- 1) Repeated short circuits at the UPS output
 - 2) Inverter bridge malfunctioning

This state can be reset by means of a push-button on the μ P board.

A25 SHORT CIRC = Intervention of the short circuit protection (current exceeding 200%)

- Possible causes:
- 1) Problems on the load
 - 2) Distribution problems downstream of the UPS

3. LCD DISPLAY MANAGEMENT

3.1 DEFAULT



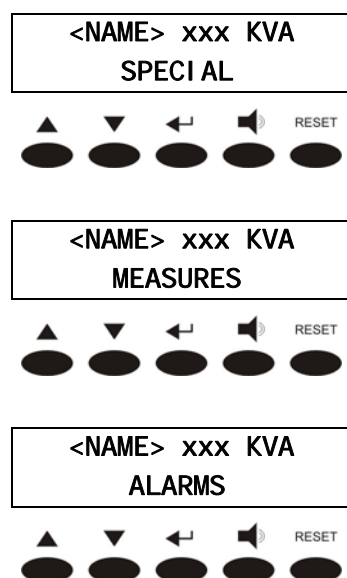
The default screen appears on the LCD panel when the UPS is in normal operation (with no alarm present); it shows the name of the UPS the nominal power and the value of the output voltage.

Pressing a key the main menu, with all the functions and parameters, is accessed

After 5' during which no key is pushed, if there isn't any alarm and the battery is not in discharge mode the Default screen is shown again.

3.2 MAIN MENU

The screen of the main menu, equal for 1Ph and 3Ph UPS's, appears as follows.



SPECIAL menu. It is accessed pressing the key ← (see 3.5), pressing the keys ▲ or ▼ the other menu are scrolled down.

MEASURES menu. It is accessed pressing the key ← (see 3.3), pressing the keys ▲ or ▼ the other menu are scrolled down.




ALARMS menu. It is accessed pressing the key ← (see 3.4), pressing the keys ▲ or ▼ the other menu are scrolled down.

3.3 MEASURES

The following pictures shows the structure of the MEASURES menu.




<NAME> xxx KVA
OUTPUT



OUTPUT measures. It is accessed pressing the key  (see 3.3.1), pressing the keys  or  the other sub-menu are scrolled down.




<NAME> xxx KVA
BYPASS



BYPASS measures. It is accessed pressing the key  (see 3.3.1), pressing the keys  or  the other sub-menu are scrolled down.




<NAME> xxx KVA
INVERTER



INVERTER measures. It is accessed pressing the key  (see 3.3.1), pressing the keys  or  the other sub-menu are scrolled down.




<NAME> xxx KVA
AC/DC



DC measures. It is accessed pressing the key  (see 3.3.1), pressing the keys  or  the other sub-menu are scrolled down.




<NAME> xxx KVA
BATTERY



BATTERY measures. It is accessed pressing the key  (see 3.3.1), pressing the keys  or  the other sub-menu are scrolled down.

<NAME> xxx KVA
EXIT



Pressing the key  the main menu screen is shown, pressing the keys  or  the other sub-menu are scrolled down.

NOTE

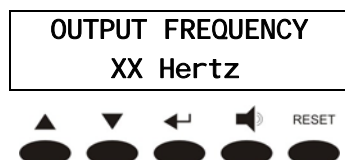
In the following paragraphs the sub-menu will be always represented as shown in the 3Ph UPS systems; the voltage measures are always referred to the phase-to-neutral value.

The structure of the sub-menu for the 1Ph systems remains exactly the same, but the screens and the parameters are slightly different.

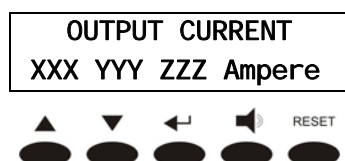
3.3.1 Output



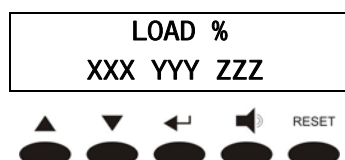
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



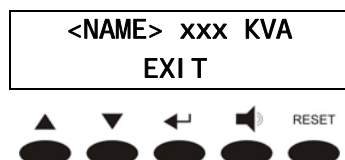
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.

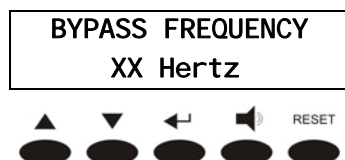


Pressing the key ← leads to the MEASURES menu screen (see 3.3), pressing the keys ▲ or ▼ the measures are shown again.

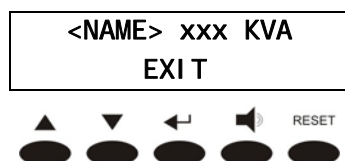
3.3.2 Bypass



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ← leads to the MEASURES menu screen (see 3.3), pressing the keys ▲ or ▼ the measures are shown again.

3.3.3 Inverter

I NVERTER VOLTAGE
XXX YYY ZZZ Vol t



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.

I NVERTER FREQUENCY
XX Hertz



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.

<NAME> xxx KVA
EXI T



Pressing the key ← leads to the MEASURES menu screen (see 3.3), pressing the keys ▲ or ▼ the measures are shown again.

3.3.4 AC/DC

This menu is active only when the battery is not discharging. If the battery is in discharge mode the menu BATTERY is automatically shown.

AC/DC VOLTAGE
XXX Vdc



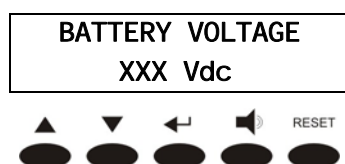
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.

<NAME> xxx KVA
EXI T

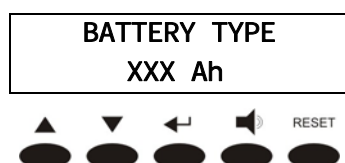


Pressing the key ← leads to the MEASURES menu screen (see 3.3), pressing the keys ▲ or ▼ the measures are shown again.

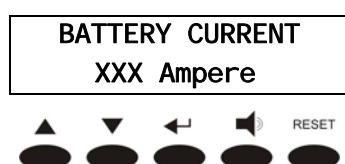
3.3.5 Battery



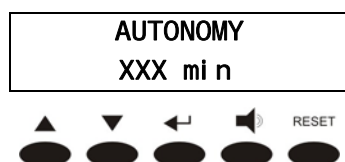
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



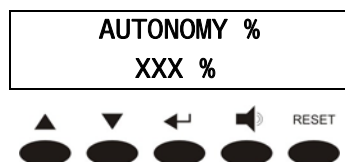
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



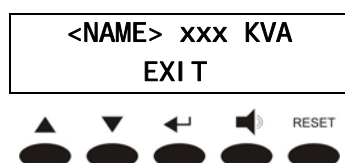
Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



Pressing the key ▼ the following parameter is shown, while the key ▲ leads to the previous screen.



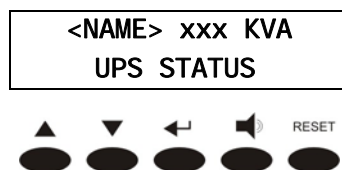
Pressing the key ← leads to the MEASURES menu screen (see 3.3), pressing the key ▲ or ▼ the measures are shown again.

3.4 ALARMS

This menu, when selected, shows the status of the equipment and the current alarms are shown (see list below).

Each time an alarm occurs, the display goes to this menu to indicate the alarms present; the audible alarm can be silenced pressing the key . The exit is disabled if the alarm is not silenced.

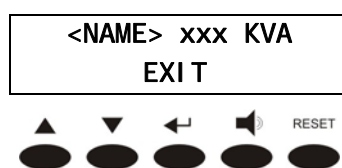
The following pictures shows the structure of the ALARMS menu.



Alarms and status of the UPS. It is accessed pressing the key (see 3.4.1), pressing the keys or the other sub-menu are scrolled down.

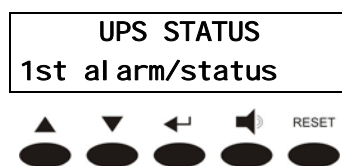


Alarms history. It is accessed pressing the key (see 3.4.2), pressing the keys or the other sub-menu are scrolled down.

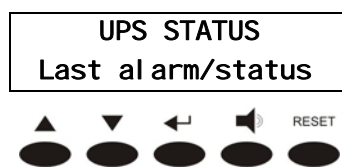


Pressing the key the main menu screen is shown, pressing the keys or the other sub-menu are scrolled down.

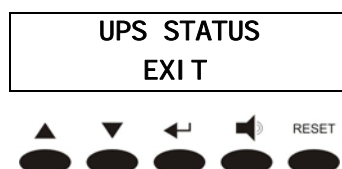
3.4.1 UPS Status



Pressing the key the status and/or the alarm of the UPS are shown, while the key leads to the previous screen.

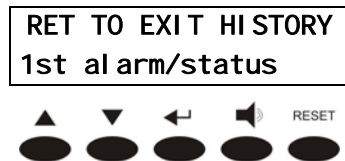


The key leads to the previous alarm/status, while pressing the key the EXIT screen is accessed.



Pressing the key leads to the ALARMS menu screen (see 3.4), pressing the key or the alarms and/or status are shown again.

3.4.2 History



Pressing the key ▼ the following alarm is shown; pressing the key ← exit the history, leading to the ALARMS menu screen (see 3.4).



Pressing the key ▼ the following alarm is shown; pressing the key ← exit the history, leading to the ALARMS menu screen (see 3.4).



Pressing the key ▼ the following alarm is shown; pressing the key ← exit the history, leading to the ALARMS menu screen (see 3.4).



Pressing the key ▼ the first alarm is shown again; pressing the key ← exit the history, leading to the ALARMS menu screen (see 3.4).

The first alarm shown is the most recent in order of time; a new alarm makes all the alarms shift one position, clearing the oldest event.

For each event is shown the alarm code, the date and time; an asterisk next to the code indicates that the alarm has cleared at the date and time indicated. The following example shows two possible screens.



Alarm A1 (MAINS FAULT) on 25/12/01 at 18:48.



Reset of alarm A1 (MAINS FAULT) on 25/12/01 at 20:12.

3.4.3 List of alarms and status

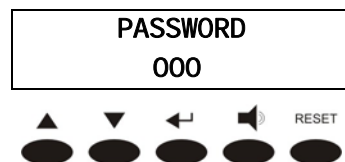
List of alarms		List of status	
A1	MAINS FAULT	S1	AC/DC OK
A2	CHARGER FAULT		
A3	RECT FUSE		
A5	AC/DC FAULT		
A6	INP WR SEQ		
A7	BCB OPEN	S2	BATT OK
A8	BATT DISCH		
A9	BATT AUT END		
A10	BATT FAULT		
A11	BATT IN TEST		
A12	PLL FAULT	S5	INV SYNC
A13	INV OUT TOL	S3	INV OK
A14	OVERLOAD	S4	INV FEED LOAD
A4	THERM IMAGE		
A15	BYP FAULT	S6	BYP OK
A16	BYP FEED LO		
A17	RETR BLOCK		
A18	MBYP CLOSE		
A19	OCB OPEN		
A20	FANS FAILURE (OPTION)		
A21	HIGH TEMP		
A22	BYP SWITCH		
A23	EPO BUS		
A24	CURR STOP		
A25	SHORT CIRC		

The status shown in this list are always displayed in ascending order when the STATUS menu is entered, the alarms are shown when they are present and must be silenced with the buzzer. The alarms remain displayed whilst they are present and they are automatically stored in the event history memory with date and time.

3.5 SPECIAL

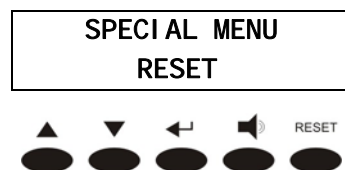
IMPORTANT

When entering the SPECIAL menu a password is required, as the operations which are allowed need to be carried out by competent personnel. For each operation a confirmation is required.



Password entering; if wrong the main menu screen is shown.

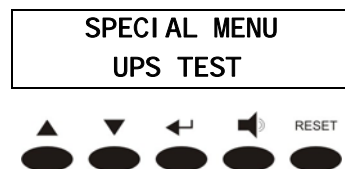
The password to enter into special menu is: 123.



Alarms history. It is accessed pressing the key (see 3.5.1), pressing the keys or the other sub-menu are scrolled down.



SETTINGS. It is accessed pressing the key (see 3.5.2), pressing the keys or the other sub-menu are scrolled down.



UPS TEST. It is accessed pressing the key (see 3.5.3), pressing the keys or the other sub-menu are scrolled down.



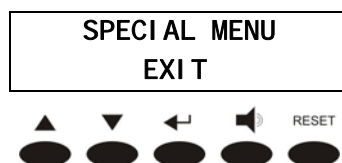
BATTERY TEST. It is accessed pressing the key (see 3.5.4), pressing the keys or the other sub-menu are scrolled down.



RESET HISTORY. It is accessed pressing the key (see 3.5.5), pressing the keys or the other sub-menu are scrolled down.



PROTOCOL TYPE. It is accessed pressing the key (see 3.5.6), pressing the keys or the other sub-menu are scrolled down.



Pressing the key the main menu screen is shown, pressing the keys or the other sub-menu are scrolled down.

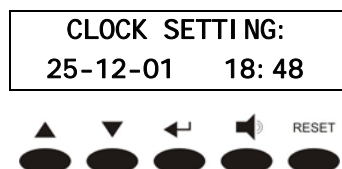
3.5.1 Reset



This menu provides a general reset of the UPS status pressing the key RESET. Pressing another key exit the menu.

3.5.2 Settings

This menu allows to update time settings for the history of alarms.



The numbers can be modified with the key or and they are confirmed by pressing . Pressing the key RESET leads to the special menu (see 3.5).

3.5.3 Test Ups



Pressing the key RESET causes the commutation to bypass. Pressing the key leads to the special menu (see 3.5).

3.5.4 Battery test

The BATTERY TEST cannot be started if the dip switch on the μ P card in “off” position.

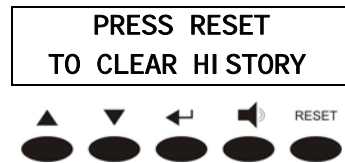



Pressing the key RESET the battery test is started. Pressing the key leads to the special menu (see 3.5).

WARNING - POSSIBLE LOSS OF LOAD!

This test can affect the continuity of supply to the loads if the battery is not fully charged.

3.5.5 Reset history

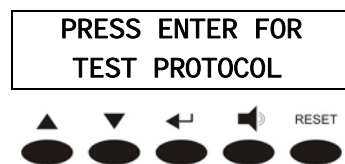





Pressing the key RESET the alarms history is cleared. Pressing the key  leads to the special menu (see 3.5).

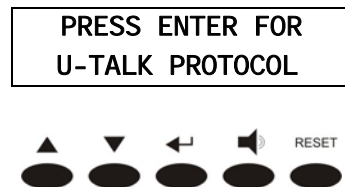
WARNING





This operation causes the cancellation of the events history memory.

3.5.6 Protocol type

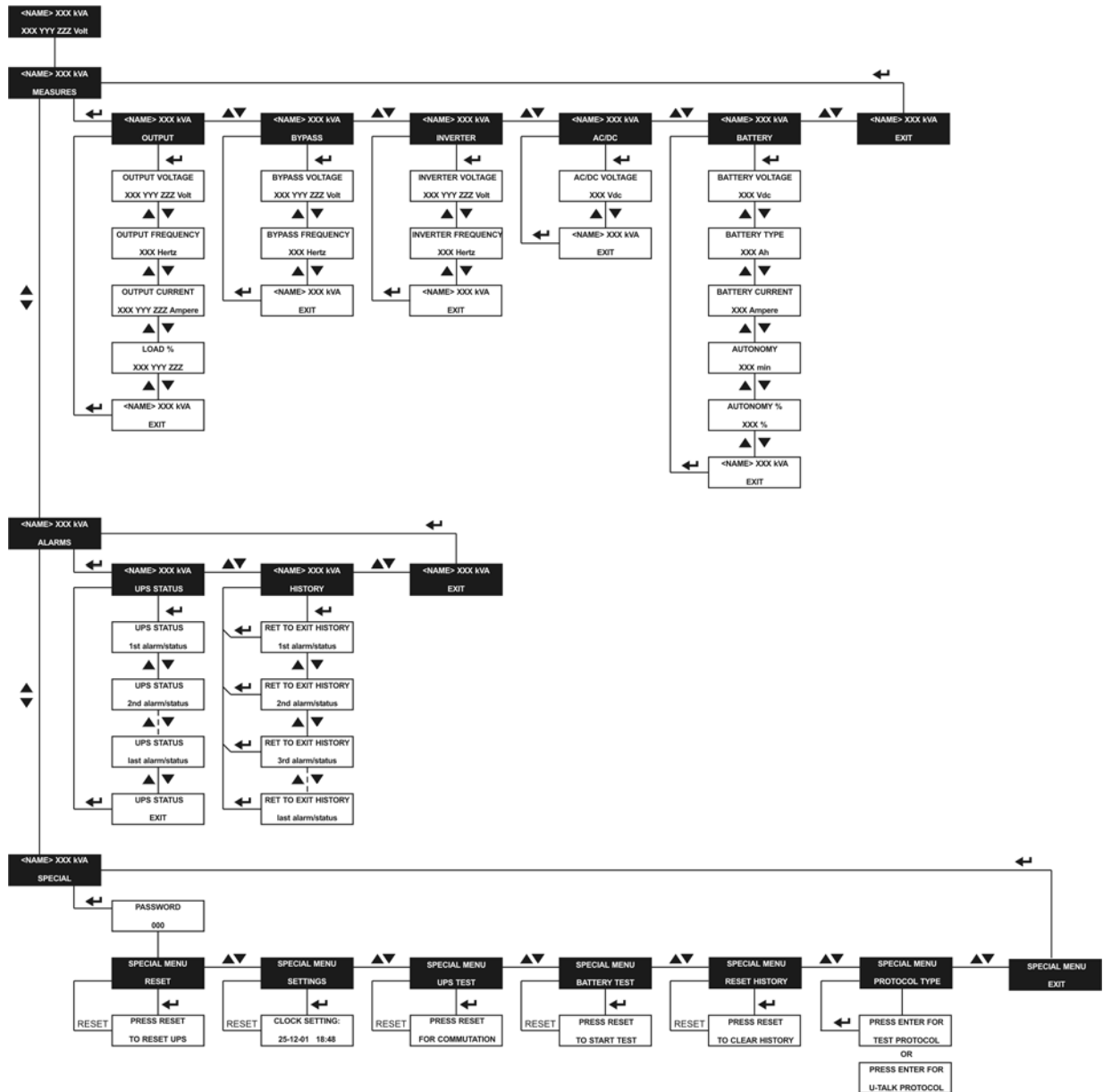


Pressing the key  the test protocol is selected. Pressing the keys  or  the other sub-menu are scrolled down.



Pressing the key  the u-talk protocol is selected. Pressing the keys  or  the other sub-menu are scrolled down. Pressing the key  leads to the special menu (see 3.5).

3.6 MENU STRUCTURE



Picture 2 - Menu structure

START-UP, SHUTDOWN & MANUAL BYPASS

Index

1. INTRODUCTION.....	2
2. START-UP PROCEDURE	2
3. SHUT-DOWN PROCEDURE (LOAD NOT SUPPLIED).....	3
4. MANUAL BY-PASS PROCEDURE.....	3
5. START-UP FROM MANUAL BY-PASS.....	4

1. INTRODUCTION

Before carrying out whatever procedure described in this chapter, read carefully the instructions, in order to avoid possible damages to persons or thing due to wrong manoeuvre.

2. START-UP PROCEDURE

For the UPS start-up, proceed as follows.

WARNING

Before switching on the UPS, make sure:

- the emergency power off push-button, connected to two terminals (Eac1 & Eac2) of UPS, is in the release position; if not, press it and proceed with the start-up procedure.
 - the input and output phase rotation is correct.
-

NOTE

The breaker BCB is installed inside the UPS's up to 30kVA. Batteries and the relevant breaker for UPS systems having higher power are external.

- 1) Close RCB and wait until display is supplied.
-

WARNING

If you close BCB breaker before it is required (by the front panel) you can damage the inverter capacitor bank and the battery.

- 2) Follow the instructions shown on the display to close the circuit breakers/isolator switches.
- 3) If the start-up procedure has been carried out correctly, the display will show: START UP END.

3. SHUT-DOWN PROCEDURE (LOAD NOT SUPPLIED)

Nr.	ACTION	LCD DISPLAYING	UPS OPERATION
1	Open OCB	A19 OCB OPEN	The supply to the load is interrupted. LED #7 lit orange
2	Open BCB	A7 BCB OPEN	The battery is disconnected from the rectifier. LED #4 orange flashing
3	Open SBCB	A7 BCB OPEN	The by-pass line is disconnected. LED #2 off.
4	Open RCB	A1 MAINS FAULT	The rectifier and inverter are switched off.
5		BLANK	Shut-down procedure end.

4. MANUAL BY-PASS PROCEDURE

WARNING

During manual bypass operation the load is supplied directly by the mains, therefore continuous supply is not guaranteed.

Nr.	ACTION	LCD DISPLAYING	UPS OPERATION
1	Move the "NORMAL-BYPASS" switch on <i>BYPASS</i>	A16 BYP→LOAD	The load is transferred to the by-pass static switch. LED #5 off, LED #6 lit orange.
2	Open RCB	A1 MAINS FAULT	The rectifier is switched off; the inverter is still on supplied by the batteries. LED #1 off, LED #4 green flashing.
3	Open BCB	A1 MAINS FAULT	The batteries are disconnected and the inverter is switched off. The load is still supplied by the by-pass static switch. LED #4 orange flashing.
4	Close MBCB	BLANK	The load is supplied by the mains through the manual by-pass circuit breaker. The by-pass static switch is still closed.
5	Open SBCB	BLANK	The by-pass line is disconnected.
6	Open OCB	BLANK	The load is now supplied directly by the mains through the manual by-pass circuit breaker. The UPS is isolated.

5. START-UP FROM MANUAL BY-PASS

Before the start-up from manual by-pass (after a maintenance or repairing) check that the "NORMAL-BYPASS" switch is in *BYPASS* position.

Nr.	LCD DISPLAYING	ACTION	UPS OPERATION
1	BLANK	Close RCB	
2	UPS START UP WAIT PLEASE		The rectifier is supplied and the DC voltage increases up to the nominal value. All LED's in the front panel are lit. The microprocessor checks all the start-up conditions are ok. LED's #1 and #3 are lit green. LED #8 is lit orange.
3	BYPASS STARTUP CLOSE SBCB	Close SBCB	
4	BYPASS STARTUP WAIT PLEASE		The microprocessor checks that all the by-pass parameters (voltage, phase sequence, frequency) are within the tolerance limits. LED #2 is lit green. The by-pass static switch is closed, LED #6 is lit orange.
5	CLOSE BCB WAIT PLEASE	Close BCB	The microprocessor checks all the conditions for the following step are ok. LED #4 is lit green.
6	CLOSE OCB WAIT PLEASE	Close OCB	The load is supplied by the by-pass static switch. The breaker MCB is still closed. LED #7 is lit green.
7	OPEN MCB WAIT PLEASE	Open MCB	The load is now supplied by the by-pass static switch only and the inverter can be started-up. LED #8 off.
8	INVERTER START UP WAIT PLEASE		The inverter IGBT bridge starts to modulate and the inverter output voltage reaches the nominal value. The microprocessor checks the synchronisation with the by-pass line.
9	MOVE BYP SWITCH WAIT PLEASE	Move the "NORMAL-BYPASS" switch on <i>NORMAL</i>	The load is transferred to the inverter static switch. LED #5 is lit green.
10	START UP END WAIT PLEASE		The microprocessor checks that all the output parameters (voltage, phase sequence, frequency) are within the tolerance limits.
11	UPS MODEL OUTPUT VOLTAGE		

REMOTE CONNECTION OF THE UPS

Index

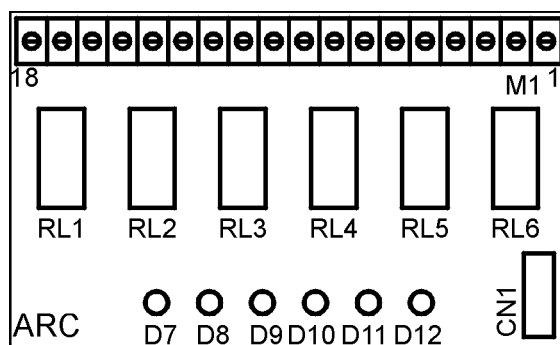
1. REMOTE CONNECTION BY ARC (OPTIONAL).....	2
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Index of pictures

<i>Picture 1 – ARC board layout.....</i>	<i>2</i>
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1. REMOTE CONNECTION BY ARC (OPTIONAL)

The ARC card is used to repeat to a remote location some UPS status and alarms, by means of SPDT (Single-Pole-Double-Throw) voltage free contacts.



Picture 1 – ARC board layout

Relay	Alarms/Status	Status	M1		Led	
			Pins	Status	Name	Status
RL1	Not available		17-18		D7	
			16-17			
RL2	Not available		14-15		D8	
			13-14			
RL3	Status = Inverter feeds the load	Energized	11-12	Closed	D9	On
			10-11	Open		
RL4	Alarm = Bypass feeds the load	Not energized	8-9	Open	D10	Off
			7-8	Closed		
RL5	Alarm = Battery low	Not energized	5-6	Open	D11	Off
			4-5	Closed		
RL6	Alarm = Mains fault	Not energized	2-3	Open	D12	Off
			1-2	Closed		

MGE UPS SYSTEMS

T H E U N I N T E R R U P T I B L E P O W E R P R O V I D E R

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